AMENDMENTS TO THE CLAIMS

IN THE CLAIMS:

A complete set of claims is provided below.

1. (Currently Amended) A method of data compression, comprising:

partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, each of said basis functions corresponding to an original source;

selecting a plurality of spherical angles;

~~**using a computer system,**~~ calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances **wherein a plurality of said basis functions in said first group describes electric fields produced by electric charge**;

using a first rank reduction to reduce ~~**reducing**~~ a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a ~~**number N**~~ **plurality** of said original basis functions;

partitioning a first set of weighting functions into groups, each group corresponding to ~~**one of said regions**~~ **a region**, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester;

~~**using a computer system,**~~ calculating a far-field disturbance received by each of said testers in a first group for each of said spherical angles to produce a matrix of received disturbances;

using a second rank reduction to reduce ~~**reducing**~~ a rank of said matrix of received disturbances to yield a second set of weighting functions, said second set of weighting functions corresponding to composite testers, each of said composite testers comprising a linear combination of a ~~**number *M***~~ **plurality** of said original testers~~,~~ ~~**wherein at least one of either *M* or *N* is greater than one**~~; and

transforming said system of linear equations to use said composite sources and said composite testers to produce a second system of equations wherein at least a portion

of said second system of equations is compressed relative to said system of linear equations and wherein for at least a first portion of said second system of equations, said first portion using said composite sources and said composite testers, at least a portion of said matrix of transmitted disturbances is different from said matrix of received disturbances **and using said second system of equations on a computing system and wherein said compression enables relatively more efficient said use on said computing system**

and computing a resulting electric field due, at least in part, to said plurality of said basis functions in said first group.

2. (Currently Amended) A method of data compression, comprising:

partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to an unknown in a system of equations, each of said basis functions corresponding to an original **physical** source;

selecting a first plurality of angular directions;

using a computer system, calculating a disturbance produced by each of said basis functions in a first group for each of said angular directions to produce a matrix of disturbances;

using said matrix of disturbances to compute a second set of basis functions, said second set of basis functions corresponding to composite sources, wherein at least one of said composite sources is configured to produce a relatively weak disturbance from a portion of space around said at least one composite source;

partitioning a first set of weighting functions into groups, each group corresponding one of said regions, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester;

using a computer system, calculating a disturbance received by each of said testers in a second plurality of angular directions to produce a matrix of received disturbances;

using said matrix of received disturbances to compute a second set of weighting functions, said second set of weighting functions corresponding to composite testers,

wherein at least one of said composite testers is configured to weakly receive disturbances from a portion of space relative to said at least one composite tester; and

transforming at least a first portion of said system of equations into a transformed system of equations to use one or more of said composite sources and one or more of said composite testers wherein at least a second portion of said transformed system of equations is compressed relative to said system of equations

and wherein for an element of said second portion said matrix of disturbances is, at least in part, different from said matrix of received disturbances

and using said compressed second portion of said transformed system of equations to compute an electric field or a pressure field due, at least in part, to said physical sources,

wherein said compression results in efficiencies in said calculation of said electric field or said pressure field.

3. (Original) The method of Claim 2, wherein said matrix of disturbances is a moment method matrix.

4. (Original) The method of Claim 2, wherein said step of using said matrix of disturbances to compute a second set of basis functions comprises reducing a rank of said matrix of disturbances.

5. (Original) The method of Claim 2, wherein said step of using said matrix of received disturbances to compute a second set of weighting functions comprises reducing a rank of said matrix of received disturbances.

6. (Original) The method of Claim 2, wherein said disturbance is at least one of an electromagnetic field, a heat flux, an electric field, a magnetic field, a vector potential, a pressure, a sound wave, a particle flux, a weak nuclear force, a strong nuclear force, and a gravity force.

7. (Original) The method of Claim 2, wherein said first plurality of directions is substantially the same as said second plurality of directions.

8. (Original) The method of Claim 2, wherein said regions of space around said at least one composite source are far-field regions.

9. (Original) The method of Claim 2, wherein said at least a portion of a region around said at least one composite tester is a far-field region.

10. (Currently Amended) A method of data compression, comprising:

calculating one or more composite sources as a linear combination of more than one basis functions, **wherein said more than one basis functions describe an electric current and** wherein at least one of said composite sources is configured to produce a relatively weak disturbance in a portion of space related to said at least one composite source;

using a computer system, calculating one or more composite testers as a linear combination of more than one weighting functions, wherein at least one of said composite testers is configured to be relatively weakly affected by disturbances propagating from a portion of space around said at least one composite tester; and

transforming at least a portion of a first system of equations based on said basis functions and said weighting functions into second equations based on said composite sources and said composite testers, wherein for an element of said second equations one of said one or more composite sources and one of said one or more composite testers are computed using at least partially different data, and wherein said second equations are compressed relative to said first system of equations

and using said compressed nature to efficiently compute an electric field resulting, at least in part, from said more than one basis functions.

11. (Original) The method of Claim 10, wherein said disturbance is at least one of, an electromagnetic field, a heat flux, an electric field, a magnetic field, vector potential, a

pressure, a sound wave, a particle flux, a weak nuclear force, strong nuclear force, and a gravity force.

12. (Previously Presented) The method of Claim 10, wherein said composite sources comprise electric currents.

13. (Original) The method of Claim 10, wherein said composite sources comprise magnetic currents.

14. (Original) The method of Claim 10, wherein said composite sources comprise acoustic sources.

15. (Original) The method of Claim 10, wherein said composite sources comprise electromagnetic sources.

16. (Original) The method of Claim 10, wherein said composite sources comprise thermal sources.

17. (Original) The method of Claim 10, wherein each of said composite sources corresponds to a region.

18. (Original) The method of Claim 10, wherein said second system of equations is described by a sparse block diagonal matrix.

19. (Original) The method of Claim 18, further comprising the step of reordering said sparse block diagonal matrix to shift relatively larger entries in said matrix towards a desired corner of said matrix.

20. (Original) The method of Claim 10, further comprising the step of solving said second system of equations.

21. (Original) The method of Claim 10, further comprising the step of solving said second system of equations to produce a first solution vector, said first solution vector expressed in terms of said composite testers.

22. (Original) The method of Claim 21, further comprising the step of transforming said first solution vector into a second solution vector, said second solution vector expressed in terms of said weighting functions.

23.-33. (Canceled)

34. (Previously Presented) The method of Claim 1, wherein said transforming said system of linear equations produces a substantially sparse system of linear equations.

35. (Canceled)

36. (Previously Presented) The method of Claim 35, wherein said transforming said system of linear equations produces a substantially sparse system of linear equations.

37. (Previously Presented) The method of Claim 36, wherein said matrix of transmitted disturbances is substantially different from said matrix of received disturbances.

38. (Canceled)

39. (Canceled)

40. (Previously Presented) The method of Claim 1, wherein said matrix of received disturbances comprises a moment-method matrix.

41. (Previously Presented) The method of Claim 1, wherein said matrix of transmitted disturbances comprises a moment-method matrix.

42. (Previously Presented) The method of Claim 2, wherein said matrix of received disturbances comprises a moment-method matrix.

43. (Previously Presented) The method of Claim 2, wherein said transforming at least a portion of said system of equations to use one or more of said composite sources and one or more of said composite testers comprises transforming substantially all of said system of equations to use one or more of said composite sources and one or more of said composite testers.

44. (Previously Presented) The method of Claim 43, wherein said transforming substantially all of said system of equations produces substantial sparseness.

45. (Previously Presented) The method of Claim 2, wherein said relatively weak disturbance from a portion of space around said at least one composite source comprises a relatively weak disturbance from a far-field portion of space.

46. (Previously Presented) The method of Claim 2, wherein said relatively weak disturbance from a portion of space around said at least one composite source comprises a portion of space at distances relatively shorter than a distance to other physical regions.

47. (Previously Presented) The method of Claim 46, wherein said portion of space at distances relatively shorter than a distance to other physical regions comprises a relatively non-intertwining portion of space.

48. (Previously Presented) The method of Claim 2, wherein said relatively weak disturbance from a portion of space around said at least one composite source comprises a

portion of space comprising substantially all angular directions in said first plurality of angular directions.

49. (Previously Presented) The method of Claim 48, wherein said portion of space comprising substantially all angular directions in said first plurality of angular directions comprises a relatively non-intertwining portion of space.

50. (Previously Presented) The method of Claim 10, wherein said transforming at least a portion of a first system of equations comprises transforming substantially all of a first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers.

51. (Previously Presented) The method of Claim 50, wherein said second system of equations is substantially sparse.

52. (Previously Presented) The method of Claim 10 wherein said at least a portion of a first system of equations comprises an interaction between at least one of said basis functions is relatively close to and at least one of said weighting functions.

53. (Previously Presented) The method of Claim 52 wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances.

54. (Previously Presented) The method of Claim 10 wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances.

55. (New) A method of data compression, comprising:

partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, each of said basis functions corresponding to a physical source;

selecting a plurality of spherical angles;

calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances;

reducing a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a plurality of said original basis functions;

identifying weighting functions, each weighting function corresponding to a condition, each of said weighting functions corresponding to a tester; and

transforming said system of linear equations to use one or more of said composite sources and one or more of said testers to produce a second system of equations wherein at least a portion of said second system of equations is compressed relative to said system of linear equations and wherein at least a first portion of said second system of equations uses said composite sources and said original testers.

and using said transformed system of equations to compute a disturbance produced by said physical sources.